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LANDSAT DATA CONTINUITY MISSION

ACRONYM LIST AND LEXICON

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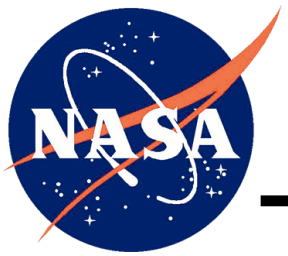
Revision B



Goddard Space Flight Center
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National Aeronautics and Space Administration

CM FOREWORD

This document is a Landsat Data Continuity Mission (LDCM) Project Configuration Management (CM)-controlled document. Changes to this document require prior approval of the applicable Configuration Control Board (CCB) Chairperson or designee. Proposed changes shall be submitted to the LDCM CM Office (CMO), along with supportive material justifying the proposed change. Changes to this document will be made by complete revision.

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LDCM PROJECT
DOCUMENT CHANGE RECORD

Sheet: 1 of 1

REV. LEVEL	DESCRIPTION OF CHANGE	DATE APPROVED
Rev -	Baseline Release. Approved by CCR 427-000005.	01/04/07
Rev. A	Incorporated changes associated with the release of the Spacecraft Request For Offer. Approved by CCR 427-00000xx	11/30/07
Rev. B	Incorporated changes associated with the NASA/GSFC review of the Spacecraft Request For Offer. Primarily identified acronyms used in the SOW and CDRLs. Approved by CCR 427-07-02-011.	12/06/07

TABLE OF CONTENTS

1.0 ACRONYM LIST

ABML As-Built Materials List

ABPL As-Built Parts List

ADF Ancillary Data File

ADML As-Designed Materials List

ADPL As-Designed Parts List

AFB United States Air Force Base

ALI Advanced Land Imager

ANSI American National Standards Institute

AOCS Attitude and Orbit Control System

AOS Acquisition of Signal

ARO After Receipt of Order

ASIC Application Specific Integrated Circuits

ASQC American Society for Quality Control

ASTM American Society for Testing of Materials

BER Bit Error Rate

BRDF Bi-directional Reflectance Distribution Function

C&DH Command and Data Handling

CADU Channel Access Data Unit

CAGE Commercial and Government Entity

CCB Configuration Control Board

CCP Contamination Control Plan

CCSDS Consultative Committee on Space Data Systems

CDR Critical Design Review

CDRL Contract Data Requirements List

CFR Code of Federal Regulations

CIL Critical Items List

CM Configuration Management

CN	Coherent Noise
CNDs	Could-Not-Duplicates
CO	Contracting Officer
COC	Certificate of Completion
COG	Center of Gravity
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off-The-Shelf
CPT	Comprehensive Performance Test
CPU	Central Processing Unit
CRM	Continuous Risk Management
CTE	Calibration Test Equipment
CVCM	Collected Volatile Condensable Mass
DACA	Days After Contract Award
DC	Direct Current
DCN	Documentation Change Notices
DDD	Displacement Damage Dose
DM	Data Management
DN	Digital Number
DO	Delivery Order
DOD	Department of Defense
DOI	Department of the Interior
DPA	Destructive Physical Analysis
DRD	Data Requirements Description
DRFP	Draft Request for Proposal
DUNS	Data Universal Numbering System
EC	Electronic Copy
ECI	Earth Centered Inertial
EDAC	Error Detection and Correction
EDU	Engineering Development Unit

EEE	Electrical, Electronic, Electromechanical
EIA	Electronic Industry Alliance
ELV	Expendable Launch Vehicle
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EO-1	Earth Observer 1
EOL	End of Life
EOS	Earth Observing System
EROS	Earth Resources Observation and Science
ESD	Electrostatic Discharge
ETM+	Enhanced Thematic Mapper Plus
EVP	Environmental Verification Plan
EVS	Earned Value System
EWR	Eastern and Western Ranges
FAR	Federal Acquisition Regulation
FDC	Failure Detection and Correction
FGDC	Federal Geographic Data Committee
FMEA	Failure Modes, Effects Analysis
FMECA	Failure Modes, Effects and Criticality Analysis
FOR	Flight Operations Review
FOV	Field of View
FPA	Focal Plane Array
FPE	Focal Plane Electronics
FRB	Failure Review Board
FTA	Fault Tree Analysis
FWHM	Full Width Half Maximum
GAO	General Accounting Office
GDS	Ground Data Systems
GEVS	General Environmental Verification Specification

GFE	Government Furnished Equipment
GFY	Government Fiscal Year
GIA	Government Inspection Agency
GIDEP	Government Industry Data Exchange Program
GOP	Ground Operations Plan
GPD	GSFC Policy Directive
GPS	Global Positioning System
GSD	Ground Sample(ing) Distance
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
HC	Hard Copy
HUB	Historically Underutilized Business
HTL	Hazard Tracking Log
I&T	Integration and Test
IAC	Independent Assurance Contractor
IC	International Cooperator
ICD	Interface Control Document
IDF	Image Data File
IIRR	Instrument Integration Readiness Review
IMS	Integrated Master Schedule
IOC	Initial Operational Capability
IPC	Institute for Interconnecting and Packaging Electronic Circuits
IPSR	Instrument Pre-Ship Review
IRD	Interface Requirements Document
IRU	Inertial Reference Unit
ISO	International Organization for Standardization
ITAR	International Traffic in Arms Regulations
IV&V	Independent Verification and Validation
KHB	Kennedy Space Center Handbook

LDCM	Landsat Data Continuity Mission
LGS	Landsat Ground Station
LGN	LDCM Ground Network
Lmax	Maximum Radiance
LMST	Local Mean Solar Time
LOS	Line of Sight or Loss of Signal
LPT	Limited Performance Test
LRD	Launch Readiness Date
LRR	Launch Readiness Review
LTAP	Long Term Acquisition Plan
Ltypical	Typical Radiance
LV	Launch Vehicle
M&PCB	Materials and Processes Control Board
M&PCP	Materials and Processes Control Program
MAE	Materials Assurance Engineer
MAIP	Mission Assurance Implementation Plan
MAM	Mission Assurance Manager
MAR	Mission Assurance Requirements
MCM	Multi-Chip Module
MEB	Materials Engineering Branch
MIL	Materials Identification List
MLPL	Materials, Lubricants and Processes List
MOC	Mission Operations Control Center
MODIS	Moderate Resolution Imaging Spectrometer
MODTRAN	Moderate Resolution Transmittance
MOI	Moment of Inertia
MOR	Mission Operations Review
MPCB	Material and Processes Control Board

MPR	Monthly Progress Review
MPSR	Management Program Status Review
MRB	Material Review Board
MSFC	Marshall Space Flight Center
MSPSP	Missile System Prelaunch Safety Data Package
MUA	Materials Usage Agreement
NAS	NASA Assurance Standard
NASA	National Aeronautics and Space Administration
NASCOM	NASA Communications Network
NDE	Non-Destructive Examination
NDVI	Normalized Difference Vegetation Index
NEPAG	NASA EEE Parts Assurance Group
NHB	NASA Handbook
NIR	Near Infrared
NIST	National Institute of Standards and Technology
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
NPSL	NASA Parts Selection List
NRCA	Nonconformance Reporting and Corrective Action
NSPAR	Nonstandard Parts Approval Request
NSS	NASA Safety Standard
NTE	Not To Exceed
NUC	Non-Uniformity Correction
OBP	On-Board Processor
OHA	Operations Hazard Analysis
OLI	Operational Land Imager
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
OSSMA	GSFC Office of Systems Safety and Mission Assurance

PAPL	Project Approved Parts List
PCB	Parts Control Board
PCP	Parts Control Plan
PDL	Product Design Lead
PDR	Preliminary Design Review
PER	Performance Evaluation Review or Pre-Environmental Review
PF	Polarization Factor
PFR	Problem / Failure Report
PIL	Parts Identification List
PM	Program Management
PPL	Preferred Parts List
PR	Program Review
PRA	Probabilistic Risk Assessment
PSD	Power Spectral Density
PSM	Project Safety Manager
PSR	Program Status Review or Pre-Shipment Review
PTP/MOE	Programmable Telemetry Processor / Mission Operations Element
PWB	Printed Wiring Board
QA	Quality Assurance
QCM	Quartz Crystal Microbalance
QMS	Quality Management System
RBS	Reflective Band Sensor
RF	Radio Frequency
RFP	Request for Proposal
ROI	Return on Investment
RSDO	Rapid Spacecraft Development Office
SC	Spacecraft
SCA	Sensor Chip Assembly

SCC	Stress Corrosion Cracking
SCM	Software Configuration Management
SCR	System Concept Review
SDR	System Design Review
SDMP	Software Development and Management Plan
SE	Systems Engineering
SEE	Single-Event Effect
SEL	Single-Event Latchup
SEU	Single-Event Upset
SI	Science Instrument
SMA	Safety and Mission Assurance
SMD	Stored Mission Data
SNR	Signal to Noise Ratio
SOW	Statement of Work
SPSR	System Pre-Ship Review
SPVP	System Performance Verification Plan
SQA	Software Quality Assurance
SQMS	Software Quality Management System
SR	System Review
S-RD or SRD	Spacecraft Requirements Document
SRO	Systems Review Office
SDR	System Design Review
SRR	System Requirements Review
SRT	Systems Review Team
SSIP	System Safety Implementation Plan
STE	System Test Equipment
STM	Structural Thermal Model
SW	Software

SWIR	Short Wave Infrared
T/V	Thermal/Vacuum
TBC	To Be Confirmed
TBD	To Be Determined
TBR	To Be Reviewed or To Be Resolved
TBS	To Be Supplied
TDI	Time Delay Integration
TID	Total Ionizing Dose
TIM	Technical Interchange Meeting
TIRS	Thermal Infrared Sensor
TML	Total Mass Loss
TQCM	Thermoelectric Quartz Crystal Microbalance
TSIS	Total Solar Irradiance Sensor
USG	United States Government
USGS	United States Geological Survey
V&V	Verification and Validation
VNIR	Visible and Near Infrared
VTL	Verification Tracking Log
WBS	Work Breakdown Structure
WCA	Worst Case Analysis
WGS84	World Geodetic System 1984
WRS-2	Worldwide Reference System - 2

2.0 LEXICON

Allocation – An allocation is a requirement which is derived by partitioning a higher level requirement into lower level component requirements and making an assignment of values to that lower level. Allocation statements use the verb "shall".

Ancillary Data - A selected subset of observatory telemetry that provides information about the on-orbit environment and observatory status at the time of the image sensor data collections. Ancillary data includes all observatory telemetry necessary to produce a scene data product. Ancillary data typically includes relevant instrument parameters, calibration parameters, observatory attitude and ephemeris, etc.

Attitude reference frame knowledge - The pointing information for the three orthogonal axes of rotation as calculated by the observatory attitude control system and displayed in observatory housekeeping telemetry. It is expressed as an angular rotation offset about each axis from a pre-defined nominal pointing orientation.

Audit – A review of the developers, contractor's or subcontractor's documentation or hardware to verify that it complies with project requirements.

Authentication – Security measure designed to establish the validity of a transmission, message, or originator. Authentication provides the assurance that information transmitted from a claimed source (i.e., a source's identity) actually came from that source.

Autonomy – Autonomous operations is the actions taken by a component or system based on logic contained in the flight code (software, FPGA, ASIC, etc.). Autonomy does not preclude or include stored command sequences (absolute or relative) or pre-defined command sequence responses to on-orbit conditions.

Auxiliary Data – Supporting data sets provided outside the LDCM Mission data stream. These data are used to apply corrections or adjustments to the LDCM mission data. Thus, producing images that meet LDCM processed image requirements. Examples include previously derived calibration parameters, ground control data, digital elevation data, and GPS offset data.

Azimuth – Angle measured in the ecliptic or equatorial plane as part of a spherical polar coordinate system (radius or altitude, azimuth and elevation).

Bi-directional Reflectance Distribution Function (BRDF) - A function that expresses reflectance from a surface into a unit projected solid angle as a function of both the direction of illumination and the direction of observation.

Boresight – The instrument pointing reference direction coinciding with or at a known offset to the instrument optical axis, nominally intersecting the center of the focal plane array.

Bright Target Recovery - The recovery of the system from a saturation event such as a sun glint

Calibrate - The process of characterizing system behavior to a known standard or controlled input. Calibration is performed to determine correction parameters (e.g. gains and offsets) that can be applied to the data to correct for systematic errors.

Calibration Maneuver – A spacecraft attitude adjustment made to view a calibration source (i.e. deep space, moon, earth limb, ground target).

Channel Access Data Unit (CADU) – A Channel Access Data Unit is a CCSDS-defined frame format.

Characterize – The use of a set of measurements and analyses to describe the performance of a device or product over the relevant operating range. This includes taking point measurements, modeling the variation in a characteristic as a function of one or more parameters (e.g., temperature, time), measuring stability over a range of conditions, and computing error estimates.

Coherent Noise – A spurious, periodic pattern of noise within an image, generally of electronic origin

Collect – to acquire, downlink, and subsequently transfer of mission data from the observatory to the Data Processing and Archive Segment

Collected Volatile Condensable Material (CVCM) - The quantity of out gassed matter from a test specimen that condenses on a collector maintained at a specific constant temperature for a specified time.

Contact: A single Observatory AOS to LOS session taken at either a ground station or a communication satellite such as TDRSS.

Dark Detectors - Detectors on the focal plane of the instrument that are masked from receiving all incoming light, but are otherwise identical to the detectors observing the Earth reflected radiation.

Dead Pixels – See Inoperable Pixels

Definitive Ephemeris Data - A data set that provides a post processed, time varying, orbital states derived from a set of observations. Typically, this includes the position, velocity and time expressed over a regular time interval.

Demonstrate - Show that the current knowledge of one or more system parameters is correct and accurate by collecting and processing test data using current calibration parameters, and analyzing the performance of the processed results.

Detector – A single physical sensing element that produces an electrical output in response to incident electromagnetic radiation. If time delayed integration (TDI) is used, the outputs of multiple detectors in a column are summed to produce a single output. This single output may also be considered as the output of a single "detector". In the case of redundant detectors, only the selected active detectors are considered in defining the "detector".

Detector Column - A set of physical detectors imaging the same spatial locations for a single band, which are treated as a single sensing element by having their outputs combined in time-delay integration (TDI). Within the detector column, individual detectors may be deselected.

Digital Number (DN) - The output from a detector sample quantized to a discrete integer value.

Discrepancy - Refer to Nonconformance

Displacement Damage - Degradation in a bipolar or opto-electronic device resulting from displacement of atoms in the semiconductor lattice by energetic particles.

Dynamic Range - The range of radiances over which instruments and sensors are sensitive. The upper end of the dynamic range is the saturation radiance. The lower end is the noise floor, i.e., the radiance corresponding to the low radiance noise level of the instrument. These radiances may be expressed as equivalent blackbody temperatures for thermal bands.

Edge Response - The response of an imaging system to an edge target (i.e., a low/high or high/low step function), normalized so that the mean response on the low side of the edge target is set to zero and the mean response on the high side of the edge target is set to 100%.

Encryption: Security measure designed to prevent unauthorized access to data or control of the observatory. Encryption is achieved by converting plain text to equivalent cipher text by means of a code.

Ephemeris Data - A set of data that provides the position, velocity and time of a celestial body (including a manmade satellite) for regular intervals in time. Ephemeris data helps to characterize the conditions under which remote sensing data are collected and may be used to correct the sensor data prior to analysis.

Expedited Production – Expedited production is defined as orders for LDCM data products to be generated from the archive with a rapid (expedited) turnaround time.

Failure Modes, Effects and Criticality Analysis (FMECA) - A procedure by which each credible failure mode of each item from a low indenture level to the highest is analyzed to determine the effects on the system and to classify each potential failure mode in accordance with the severity of its effect.

Federal Geographic Data Committee (FGDC) - Established by the Office of Management and Budget for purposes of coordinating the development, use, sharing and dissemination of geographic data.

Field of View – The angular extent of the region from which a sensor can collect data without changing position or orientation. This can be applied to either the sensor as a whole or to individual detectors in which case it is referred to as the instantaneous field of view (IFOV).

Focal Plane – The detectors and associated electronics assembled with the spectral bandpass filters.

Geodetic Reference System - A comprehensive geodetic model of the Earth that includes a geodetic reference frame, a best-fit Earth ellipsoid/spheroid model, and an Earth gravitational model. The inclusion of all these components allows a geodetic reference system to serve as a horizontal and vertical datum. The standard LDCM geodetic reference system is the World Geodetic System 1984 (WGS84).

Ghost Image - A ghost image is a secondary image of an object, which appears as either an attenuated rendition of the original object or a blurred and attenuated version of the original object. A ghost also has a constant displacement vector from the original image. A significant ghost is defined as an image artifact when its peak signal after background level subtraction and radiometric calibration is above 2% of the typical radiance (Ltypical) for that band.

Ground Sample Distance (GSD) - The distance on the ground between adjacent detector sample centers.

Housekeeping (Telemetry) – The engineering, health and safety, monitoring, and diagnostic telemetry data that are used in the control and operations of the observatory (spacecraft and image sensor(s)).

Image Sensor Data - The acquired science data whose characteristics are specified in the LDCM Requirements Documents. Sensor data includes calibration data that provides information on the instrument response to dark images (dark calibration) and white images (lamp calibration) or other external calibrations (solar, lunar, ground/ vicarious).

Image-to-Image Co-registration – Image-to-image co-registration is defined as the difference in geolocation of images of the same WRS-2 path and row acquired at different times.

Image Interval – The period of time that the output from the image sensor is either recorded or directly transmitted to the ground. An image interval includes nominal, calibration and off-nadir pointing of the imaging system.

Imax - The maximum response of an instrument as a polarizer analyzer is rotated.

Imin - The minimum response of an instrument as a polarizer analyzer is rotated.

Inoperable Detector - A detector that does not meet the definition of operable detector (see **Operable Detector**).

Inoperable Pixel - A pixel is considered dead or inoperable if greater than 50% of its ground projected area is not imaged by operable detectors.

Jitter - High frequency variations in sensor position and/or angular orientation leading to deviations in the actual sensor line of sight relative to the ideal line of sight over time periods up to a few seconds. Jitter may be induced by mechanical vibrations from external disturbances or internal mechanisms.

LDCM Ground Network (LGN) – The set of ground stations that are used for routine mission operations in support of the LDCM. The stations are located in Sioux Falls, South Dakota and Fairbanks, Alaska. A backup site is located in TBD.

LDCM Phases:

Design, Build, and Test Phase begins at delivery order award and continues through the start of instrument integration, excluding any storage periods.

Observatory Integration and Test Phase begins at instrument integration and continues until the Observatory is packed for shipment to the launch site.

Ground Storage Phase is any period 30-days or longer, directed by the Government, when there is no active integration and test or shipping activities underway.

Pre-Launch Phase begins after delivery of the LDCM Observatory to the launch site and ends at liftoff. This phase is divided into two sub-phases, the Observatory processing at the launch site before integration to the launch vehicle and the Observatory processing at the launch pad.

Launch and Early Orbit Phase begins at lift-off and ends after the LDCM Observatory enters Earth Point Mode and normal operations of the power and attitude control subsystems have been verified by the Flight Operations Team.
Has completed all launch and early orbit activities and entered Earth Point Mode.

Observatory Commissioning Phase begins at the completion of the Launch and Early Orbit Phase and ends with acceptance by the NASA of the LDCM Observatory for the Operational Phase of the LDCM.

Operational Phase begins at the completion of the Observatory Commissioning Phase and extends through the life of the LDCM Observatory.

Decommissioning Phase begins after the end of the Operational Phase and extends through the necessary steps for the observatory to be compliant with the NPD 8710.3, NASA Policy for Limiting Orbital Debris Generation.

Level 0 Data Product – Level 0 data products are image data with all data transmission and formatting artifacts removed, time provided, spatial, and band-sequentially ordered multi-spectral digital image data.

Level 1Gs Data Products – Level 1Gs data products consist of Level 1R data products resampled for registration to a cartographic projection, referenced to the World Geodetic System 1984 (WGS84), G873 or current version.

Level 1T Data Products – Level 1T data products consist of Level 1R data products resampled for registration to a cartographic projection, referenced to the WGS84, G873 or current version, orthorectified, and corrected for terrain relief.

Level 1R Data Products –Level 1R data products consist of radiometrically corrected image data derived from Level 0 data linearly scaled to at-aperture spectral radiance.

Lossless Compression – A data compression process such that the data, after compression and decompression, is identical numerically to the data prior to compression.

Measure - Provide a value for a particular system parameter or performance characteristic by direct observation

Metadata – A set of descriptive information about the scene data contained in the archive. The information is sufficient for a user, during the process of scene query and selection, to determine at a minimum: geographic coverage, date of collection, sensor gain mode, time of acquisition, cloud cover, and other qualitative measurements.

Mission Data: The data set containing LDCM imaging sensor data and ancillary data.

Mission Lifetime: The LDCM Mission Lifetime starts at the NASA acceptance of the LDCM Observatory and continues until the completion of the Decommissioning Phase.

Mission Operations Center (MOC): The facility used to coordinate command and control the observatory for on-orbit operations. This facility will be used during End to End testing of all elements of the LDCM before launch.

Modulation Transfer Function Compensation (MTFC) Resampling - The modulation transfer function compensation resampling technique assigns a value to each output (resampled) pixel, computed as a weighted combination of the surrounding input pixels. The input pixel value weights are computed based on the output pixel location relative to the surrounding input pixels, using an interpolation function with a spatial frequency response that has been designed to

compensate for the spatial frequency attenuation characteristics of the imaging system's modulation transfer function.

Nadir - The direction from the Observatory towards the center of the Earth. (See Reference: Space Mission Analysis and Design, Wiley J. Larson and James R. Wertz, page 94, Second Edition – 1992.)

Narrowband Data – Observatory data down linked over a narrow band width, typically S-band, which includes housekeeping data, tracking data, commands and diagnostic telemetry. In addition, narrowband data includes the commands, software updates and hard commands up linked to the observatory.

Near Infrared - The spectral region covering 700-1000 nm.

Non-uniformity Correction – Non-uniformity correction (NUC): The process of performing a reversible on-board relative correction of gain and offset for each pixel to reduce the entropy of a scene to improve data compressibility and/or reduce errors in on-board aggregation or resampling.

Observatory – The Observatory is defined as the spacecraft plus any instrument(s) that are flown as part of the LDCM.

Observatory Command Types:

Relative Time Sequence - commands that are required to be executed in a relative sequence to one another
Real Time - commands executed upon receipt and acceptance by the observatory
Absolute - commands that are to be executed at a specific time
Loads - a set of commands that are stored and executed at a future time

Observatory Design Lifetime – The Observatory design lifetime is defined as the 5-year period following the NASA Acceptance of the Observatory on-orbit.

Off-nadir Image Intervals – A continuous recording of LDCM image sensor data or an LDCM data product not yet processed into a 185-km-(cross track) by 180-km (along track) multispectral image of the earth surface where the original image data is derived from an off-nadir observation.

On-board Calibration – Sensor calibration data that provides information on the instrument's response to dark images (dark calibration) and white images (lamp calibration) for the reflective bands. Sensor calibration data that provides information on the instrument's response to known cold and hot sources (black-body calibration sources) for the thermal bands.

Operable Detector - A detector is considered operable, even if out of spec, when it meets the following requirements:

a. The detector is sensitive to photons within its spectral band and not saturated at expected operating temperatures under dark conditions.

b. The detector's noise is less than 5 times the mean noise level for the band on which it occurs.

c. The detector's dark current remains within +/- 5 times the RMS noise over the period between dark frame references.

d. The detector's actual dynamic response range is greater than 25% of the specified dynamic range; such that the Actual Dynamic Range >= 0.25 * Specified Dynamic Range.

Optical Axes - The X, Y, and Z axes of the Cartesian coordinate system that aligns its positive Z-axis with the vector of the Optical Axis of the telescope optical system traveling from the focal plane towards the objective mirror of the telescope. The Optical Axes form a right-handed coordinate system with the X-axis normal to the line formed by the detectors in each band, and its positive direction is defined to be towards the leading spectral band (the first band that images a ground target object). The Y-axis is constructed as the cross product of the Z-axis and the X-axis.

Outgassing - The emanation of volatile materials under vacuum conditions resulting in a mass loss and/or material condensation on nearby surfaces.

Panchromatic Band – A broad spectral band colleted at a finer Ground Sample Distance than other bands. Performance characteristics for this band are defined in the LDCM Operational Land Imager Requirements Document (OLI-RD).

Pixel – Short for “picture element”, it is the smallest discrete piece of image data in an image and corresponds to a single spatial sample.

Pixel Column – A pixel column is a consecutive sequence of pixels generated by a single detector.

Polarization Factor (PF) - The modulation ratio PF = (Imax-Imin)/(Imax+Imin) associated with a polarization sensitivity measurement.

Polarization Sensitivity - The sensitivity of the system to changes in the polarization of the signal.

Priority Scenes – Special image collection requests that are marked by the observatory for priority data delivery, processed immediately into Level 1 data products, and made available to the user.

Priority Schedules – Observatory command schedule uploads that are developed, uploaded, and executed in an expedited fashion, i.e. outside of the nominal schedule upload cycle.

Reflective Band Sensor Data – Reflective Band Sensor Data are the originally measured detector or detector column output counts at the native spatial and spectral possibly adjusted by reversible offset and scale corrections. Offset and scale correction reversibility implies that the relationship between the original detector counts and the remapped data counts is one-to-one for all measured detector output values. See image sensor data.

Relative Response - Within the context of the specifications for the LDCM Spectral Bands, the term Relative Response has the same definition as the Relative Spectral Radiance Response Curve.

Relative Spectral Radiance Response Curve – Is a normalized (unitless) function of Spectral Radiometric Sensitivity divided by the peak in-band Spectral Radiometric Sensitivity. The resultant data plotted against wavelength generally appears to be a continuous smoothly varying function or "curve". This is an instrument-level response (can have a filter-level spectral response curve, too) that incorporates the optical transmission of the telescope and optical bandpass filters, and the photon detector's radiance responsivity.

Scattered Light - Undesired light contamination projected on a focal plane caused primarily by uneven surface features on optical surfaces. This optical surface roughness is usually measured by performing a BRDF measurement for each optical surface.

Scene – A set of LDCM image sensor data, or an LDCM data product, representing a 185-km-(cross track) by 180-km (along track) multispectral image of the earth surface.

Sensor Chip Assembly - The smallest hardware unit of a focal plane assembly/array.

Sharpening Band - Single spectral band that may have a finer spatial resolution than the other bands, usually in an integer multiple, which allows for sharpening of the multispectral bands.

Signal-to-Noise-Ratio (SNR) - The ratio of the level of the information-bearing signal power to the level of the noise power. More precisely, the signal-to-noise ratio of the mean digital number (DN) to the standard deviation in DN. This is a temporal noise definition in that the mean DN is the time averaged value and the standard deviation in DN is the standard deviation in the time series.

Software Criticality Classifications –

(a) "Mission Critical" software is all software whose failure will cause permanent loss of the ability to successfully complete the minimum mission. Included in this classification are all LDCM Flight Software and firmware plus the ground software necessary to verify the correctness of the flight software (e.g., sensor, effector, and dynamics model software).

(b) "Mission Support" software is any software whose failure can impair any part of the mission. Recovery from failure of this class of software results in recovery of the functionality.

(c) "Engineering Analysis" software is software used in engineering analysis and simulations on an as-needed basis.

(d) "Commercial" software includes facility computer operating systems, software packages (e.g., mathematics packages, graphics packages), and high-level-language compilers employed in developing and maintaining software components.

Software Types –

(a) "Developed" software - This is all software developed in accordance with the full life cycle as defined in the Contractor's Software Development and Management Plan.

(b) "Reuse" software - This is any software that has been developed by previous projects which can be used in significant portions to reduce development cost or improve reliability of current projects.

(c) "Heritage" software - This is any Reuse software which has not only been previously developed, but which has been successfully flown (Flight Software Element), or successfully used for an equivalent Project (SDV Element).

(d) "Off-the-Shelf (OTS)" software - This includes any software purchased from a vendor including embedded run-time systems, data- base systems, mathematics and graphic packages, compilers, operating systems, etc.

Off the Shelf Software –

(a) Commercial-Off-the-Shelf (COTS) software - Software that is sold, leased, or licensed to the general public, either as a stand alone software product or embedded in a software system.

(b) Modified-Off-the-Shelf (MOTS) software - COTS software that is modified to meet unique requirements of a specific customer. This software requires ongoing unique maintenance for the life of the system not normally offered by the vendor.

(c) Government-Off-the-Shelf (GOTS) software - Software provided to the customer as GFE with no warranty or maintenance provided.

Spectral Band - An interval in the electromagnetic spectrum commonly designated by a spectral bandwidth and a center wavelength.

Spectral Band Center Wavelength – A wavelength within a spectral band, halfway between the lower and upper band edges.

Spectral Bandwidth - The wavelength interval between the lower and upper band edges. The lower band edge is the lowest wavelength where the relative spectral radiance response is 50% of the peak response. The upper band edge is the highest wavelength where the relative spectral radiance response is 50% of the peak response.

Stray Light - Light scattered onto a detector from areas outside a specified solid angle.

Streaking Parameter - The streaking parameter is defined by the following equation:

$$S_i = \left| L_i - \frac{1}{2}\left(L_{i-1} + L_{i+1}\right) \right| / L_i$$

where

L_i is the calibrated radiance value measured for a pixel at an input radiance level;

L_{i-1} and L_{i+1} are similarly defined for the $(i-1)^{th}$ and $(i+1)^{th}$ pixels.

Swath - The strip on the Earth that the instrument observes as it passes overhead.

To Be Confirmed – The term "To Be Confirmed, (TBC)" means the requirement is subject to review for appropriateness and is subject to revision. The resolution is made in coordination with the LDCM Project Office.

To Be Determined – The term "to be determined, (TBD)" means that no representative value/parameter has been identified for the requirement. Requirement determination will be made in coordination with the LDCM Project Office.

To Be Resolved – The term "To Be Resolved, (TBR)" means the requirement has at lease two potentially conflicting values. A TBR is subject to review for appropriateness and is subject to revision. The resolution is made in coordination with the LDCM Project Office.

Total-Ionizing Dose – a degradation mechanism in active electronic devices resulting from trapping of charge generated by ionizing radiation in the oxides of the device.

Validation – The term Validation is used in two distinct manners within the LDCM requirements. Validation means to check and ensure that the desired outcome is indeed the expected outcome of a requirement, process or test. The second meaning is as an independent check of the quality of the mission data to ensure that requirements are met.

Verification: The process of ensuring mission/segment requirements is satisfied. Verification occurs using one or more of these methods: analysis, test, demonstration, or inspection.

Viewing Geometry – The viewing geometry for which the data is acquired, characterized by the zenith and azimuth angles from a ground point to the sensor at the time of observation.

Visible – The spectral region covering 400-700 nm.

Wideband Data – The downlinked Mission Data combined with stored housekeeping data that have been processed and formatted for efficient data transmission.

> Examples of wideband data processing steps for LDCM purposes include lossless compression, error detection and correction coding, and pseudo-noise encoding. Examples of wideband data formatting include packet and frame-level organization of the LDCM image sensor, ancillary data and stored housekeeping data.

World Geodetic System 1984– A global geodetic reference system defined and maintained by the National Imagery and Mapping Agency (NIMA). WGS84 is the standard geodetic reference system for LDCM. For remote sensing applications such as LDCM, WGS84 can be considered to be functionally equivalent to the International Terrestrial Reference System (ITRS) and its International Terrestrial Reference Frame (ITRF) realizations.

Worldwide Reference System - 2– A path/row coordinate system used to define the ground tracks of the LDCM Observatory. The system specifies latitudinal and longitudinal coordinates for image centers and corners. In addition the WRS-2 assigns integer path (ground track) and row designations to each image center. The corner points corresponding to each path/row designation subtend a 185-km-by-180-km area on the earth surface.

WRS-2 Observation Period – The period of time necessary to complete a 16-day global repeat cycle

WRS-2 Scene – The multi-spectral digital, image data acquired from the LDCM Observatory, processed into a single image. The corner points of a processed image correspond to a path/row designation that subtends a continuous 185-km (cross track) by 180-km (along track) area on the earth surface. The original image data is derived from a nadir observation.

Zenith - The point in the celestial sphere that is exactly overhead.

Zenith Angle - The angle between the sun and the zenith for a given position on the Earth's surface. Also, the complement of the angle between the horizon and the sun (solar elevation).